MUSEUM LIBRARY

A Journal of Cold-Blooded Vertebrates

ESTABLISHED IN 1913

JANUARY-MARCH

No. 166 MARCH 23, 1928

CONTENTS OF ISSUE 166

PAGE

Notes on *Carcharias*, *Carcharhinus*, and *Carcharodon*
By DAVID STARR JORDAN 1

The Species of *Piabucina* Inhabiting Colombia
By GEORGE S. MYERS 4

Fish Notes for 1927 from Sandy Hook Bay
By C. M. BREDER, JR. 5

Two New Genera of Fishes
By GEORGE S. MYERS 7

The Relation of Size to Maturity in the Garter Snakes, *Thamnophis sirtalis sirtalis* (L.) and *T. sauritus sauritus* (L.)
By MARY DANHEIM BURT 8

Sexual Dimorphism in the Tail Length of the Common Garter Snake, *Thamnophis sirtalis sirtalis* (Linne)
By CHARLES E. BURT 13

The Reptiles of Zion National Park
By ANGUS M. WOODBURY 14

Yellow-Cheeked *Desmognathus* from Macon County, N. C.
By C. S. BRIMLEY 21

Distributional List of the Amphibians and Reptiles of Utah. No. 2.
By VASCO M. TANNER 23

Published Quarterly by the American Society of Ichthyologists and Herpetologists at Burton Hall, Northampton, Mass. Entered as second-class matter Feb. 11, 1924, at the post office at Northampton, Mass., under the Act of Aug. 24, 1912. Acceptance for mailing at special rate of postage provided for in Sec. 1103, Act of Oct. 3, 1917, authorized Feb. 11, 1924.

NOTES ON *CARCHARIAS*, *CARCHARHINUS* AND *CARCHARODON*

The synonymy of the two great sharks in Atlantic waters has been thrown into grave confusion, through inability to distinguish, on the part of the early authors, most of whom had never seen either. Unfortunately the present writer, familiar with both species, has contributed to this confusion, by failure to interpret earlier records.

The two species concerned are the Cub Shark or *Lamia*, *Carcharias lamia* of Muller and Henle, and the Great White Shark, or Man-Eater, *Carcharodon rondeleti*, of the same authors.

The beginning of confusion arises from Linnaeus's account of his *Squalus carcharias*. His short notice is a phrase from Artedi: "Squalus dorso plano, dentibus plurimis, ad lateris serratis." To this phrase Artedi adds synonyms of early writers, only one of the twenty or more named, (Rondelet, de Piscibus, Chapter 12) apparently having been acquainted with the Man-Eater, which is very rare in the Mediterranean.

I have assumed that Linnaeus and Artedi, as well as Rafinesque had the Man-Eater in mind. But I find no evidence that any of the three had any clear conception of it, although in establishing the genus *Carcharias*, with its species *Carcharias lamia* Rafinesque, as a substitute for *Squalus carcharias*, Rafinesque rather definitely indicates the Cub Shark as the species under consideration by him.

The name Carcharias as a generic term was first used by Rafinesque in 1810. It was thus defined.

"G. Carcharias. Nessuno spiraglio, due ale dorsali, un ala snali, cinque aperture branchiali da ogni lato. Coda disiguale oblique. Oss., Questo genere e il primo nell' ordine edlli Squalini, e contienne le specie le piu enorme e le piu voraci; differisce notabilmente del

genere Galeus dalla mancanza degli spiragli." Under this group one new species is described, *Carcharias taurus*, a species of *Odontaspis*, as the genera have been understood.

No type is indicated by Rafinesque, but it is evident that he had the *Squalus carcharias* of Linnaeus in mind as type, in accordance with his custom of raising Linnaean species to the rank of genera. In Rafinesque's Indice, published in the same year, 1810, a month later, *Squalus carcharias* L., appears as the type of *Carcharias* under the name of *Carcharias lamia*. The *Squalus carcharias* of Linnaeus as understood by Rafinesque was the Cub Shark, or *Lamia*. *Carcharodon* was not known to most of the succeeding authors who applied the name *Squalus carcharias* to the so-called *Carcharias lamia* instead. Cuvier distinctly makes *lamia* the type of his genus *Carcharias* as he refers to Belon's figure of "Canis carcharias" as "the only good representation" of his species.

Belon's figure plainly represents *Carcharias lamia*. It is also evident that Rafinesque has the *Lamia* in mind in referring to his "*Squalus carcharias*" or "*Carcharias lamia*." The phrase, "Coda disiguale, obbliqua," shows this, as also does the fact that the species was placed in the list of Sicilian fishes. *Carcharias lamia* is common in Sicily. Few of the earlier writers of Italy or France knew the *Carcharodon* and referred all accounts to the great shark known to them, *Carcharias lamia*. So far as the intention of the author goes, *Carcharias* of Rafinesque should be strictly synonymous with *Carcharias* of Cuvier, and both based on the same type as the *Eulamia* of Gill. *Carcharhinus* of Blainville was originally based, according to Gill, on his *Squalus commersoni*, which seems to be *Carcharhinus lamia*. In this connection we may note that Rafinesque, in 1810, seemed to have used but two general treatises on fishes, the Systema Naturae

of Linnaeus, and the Histoire Naturelle des Poissons of Lacépede. (Jordan & Everman vol. 1, p. 33.)

Unfortunately for purposes of nomenclature, Rafinesque's work was bound in two parts, the "Caratteri" with new genera and species, dated April 1, 1810, and the Indice, dated May 10, 1810, mainly a list of Sicilian fishes. But one species of *Carcharias* is mentioned in the Caratteri, and that one, *C. taurus*, is an *Odontaspis*, having little relation to either of the two fishes entangled in the name *Carcharias*, and not agreeing with the description of the genus. Being the only species then mentioned by name, it has been held to be the type of the genus. Such recognition has been made by Garman, and by Jordan & Evermann. This replacing of *Odontaspis* Agassiz, by *Carcharias* Rafinesque, has already created much confusion and is repugnant to paleontologists. For this reason the writer has proposed to regard Rafinesque's two papers as part of the same memoir, as they actually are. In this case *Squalus carcharias* could be regarded as typical of *Carcharias*, named *Carcharias lamia* Rafinesque (1810) or *Carcharias verus* Blainville (1818). If this is not approved, the name *Carcharias* may, through plenary power, be dropped altogether from the system, to be replaced by *Carcharhinus* Blainville (1816). This genus is the same as *Carcharias* Cuvier (1817), the proper type of which is the same, being the *lamia* of Rafinesque, and Risso, and the *verus* of Blainville. The various uses of the name, *lamia*, are independent each of the others.

Of the early authors, Rondelet only, seems to have known of *Carcharodon*. We may well assume that the *Squalus carcharias* of Artedi and Linnaeus were the same, as was also Blainville's *Squalus* (*Carcharhinus*) *commersoni*, the latter name being a *nomen nudum* until explained in the Faune Francaise in 1820.

If these views are accepted the species in question will stand, as with the earlier authors:

Genus	ODONTASPIS	Agassiz
1.	ODONTASPIS	*taurus* (Rafinesque)
Genus	CARCHARIAS	Rafinesque 1810
		(Carcharhinus Blainville 1816)
		(Carcharias Cuvier 1812)
		(Eulamia Gill 1861)
2.	CARCHARIAS	*carcharias* (Linnaeus)
		(Carcharias *lamia* Rafinesque, etc.)
		(Carcharias *verus* Blainville)
Genus	CARCHARODON	(Andrew Smith) Muller & Henle
3.	CARCHARODON	*rondeleti* Muller & Henle, 1838

DAVID STARR JORDAN

Stanford University, California.

THE SPECIES OF *PIABUCINA* INHABITING COLOMBIA

Some time ago Mr. Carl L. Hubbs called my attention to the discrepancy existing between the two figures of *Piabucina panamensis* Gill given by Dr. Eigenmann ("Freshwater Fishes of Northwestern South America", Mem. Carnegie Mus. IX, 1922 (1923), plate XXI). One (fig. 5) is from Gill's type in the National Museum, from the Rio Frijoles, Panama. The other (fig. 4) is taken from a specimen collected at Raspadura by Eigenmann or Wilson. Mr. Hubbs suggested that the Raspadura fish might belong to an undescribed form. I have examined the figured specimen, but in attempting its identification I have discovered what appears to be a misidentification in Dr. Eigenmann's account (t.c., pp. 126–127).

Eigenmann includes four Piabucinas, *Piabucina astrigata* Regan, *P. aureoguttata* Fowler, *P. panamensis* Gill, and *P. festae* Boulenger, of which the two first do not concern us. *Festae* was described from "Laguna de Pita", Darien. Dr. Eigenmann listed no specimens of *festae*, but numerous *panamensis* from Istmina, Tambo, Raspadura, Truando, etc. Examining the original description of *festae* (Boll. Mus. Torino, XIV, No. 346, p. 1) and Meek and Hildebrand's seemingly quite correct determinations of the two forms, (Field Mus. Publ., Zool. Ser., X, 1916, pp. 299–301), it is apparent that Eigenmann had no specimens of *panamensis* whatever, but that all listed as that species are *P. festae*. I have examined most of his material in Indiana University and find all of them agree well with *festae*. Dr. Eigenmann apparently did not realize the identity of his specimens with *festae*, described from a faded specimen, and wrongly identified them with *panamensis*.

The common "Volador" of the Atrato and San Juan basins is not, then, *Piabucina panamensis*, but *P. festae* Boulenger. This is of more importance because of the use to which this species has been put in Colombia, the destruction of yellow fever and malarial mosquitoes, *Aedes* and *Anopheles*, (see Eigenmann, Proc. Amer. Philos. Soc., LXXIII, 1924, pp. 236–238).

GEORGE S. MYERS

Stanford University,
California.

FISH NOTES FOR 1927 FROM SANDY HOOK BAY

The incidental notes that have been appearing in Copeia, under titles similar to the above, since 1922[1] were omitted last year (1926) as it was thought best to

1. Copeia, No. 114, 127, 138, and 153.

include them in a general regional list published in colaboration with J. T. Nichols.[1]

The present season (1927) was less profitable, from the standpoint of commercial fishermen, than any previous year since the inception of the present series of observations. The items of interest based on trips made by the writer or from specimens brought to the Aquarium by our collector follow.

Dasybatis centrura (Mitchill).

One male, by far the largest noted from this bay, had the following measurements: weight 180 pounds, disc (width) 3′ 6″, (length) 3′ 0″, total length 10′ 3″ (tip of tail missing). October 6.

Acipenser sturio Linnæus.

One example reported by the collector as being between 6 and 7 feet long. This was the first specimen of any considerable size that has been recorded from Sandy Hook Bay for many years. June 23.

Elops saurus Linnæus.

One specimen October 9. The first one seen since 1923 when it was relatively common.

Sphyraena borealis DeKay.

One example October 14. Not seen since 1923.

Ammodytes americanus DeKay.

A few were found in the sand just inside the tip of Sandy Hook on June 28, a late date.

Rachycentron canadus (Linnæus).

One example July 20. Not seen since 1924.

Trachinotus falcatus (Linnæus).

Three small examples taken in the "Horseshoe" on

1. The Marine Fishes of New York and Southern New England. J. T. Nichols and C. M. Breder, Jr. Zoologica, Vol. IX, No. 1, March 3, 1927, pp. 1–192, figs. 1–263.

September 21. These were about 20 to 30 mm. in length (without tail) and were passing out of the dark phase. The red of the iris was completely gone and the coloration was nearly as silvery as that of *T. carolinus*, with just a faint dusky suggestion. Compare with color notes of others from the same place. (Copeia, No. 114 and No. 153).

Trachinotus carolinus (Linnæus).

The young of this species, usually appearing in schools of from fifty up to a thousand or more, were almost completely absent this year, but five examples being taken.

Chaetodipterus faber (Broussonet).

One example October 6. Not seen since 1924.

Cyclopterus lumpus (Linnæus).

One large example June 16. The first definite record for the Bay and a late date for the region.

Pollachius virens (Linnæus).

Not uncommon in the shoreward pound nets in June, but all of a small size. Three taken June 23 measured 140, 133, 130 mm. in length (without tail). The first definite record for the Bay.

The presence of *Cyclopterus* and *Pollachius* together with *Myliobatis freminvillei* Le Sueur, *Hemitripterus americanus* (Gmelin), *Osmerus mordax* (Mitchill), *Synodus foetens* Linnæus, *Cynoscion nebulosus* (Cuvier & Valenciennes) and *Chaetodon ocellatus* Bloch of last year (recorded in Zoölogica, Vol. IX, No. 1) brings the list of definitely recorded species from Sandy Hook Bay to one hundred and fourteen.

C. M. Breder, Jr.

New York Aquarium.

TWO NEW GENERA OF FISHES

Angola Myers. Genotype *Xenopom(at)ichthys ansorgii* Boulenger. Kneriidae. Angola, West Africa.

Distinguished from *Xenopomatichthys* Pellegrin by the very small scales, 110–120 versus 60–65.

VALENCIA Myers. Genotype *Fundulus hispanicus* Cuvier and Valenciennes. Cyprinodontidae. Spain. Genital pouch of female absent; dorsal and anal set posteriorly; sexual dimorphism marked. Allied to *Profundulus* Hubbs.

GEORGE S. MYERS

Stanford University,
California.

THE RELATION OF SIZE TO MATURITY IN THE GARTER SNAKES, *THAMNOPHIS SIRTALIS SIRTALIS* (L.) AND *T. SAURITUS SAURITUS* (L.)[1]

This study was begun from interest in the relation between the size of female snakes and the bearing of their young, and since dissection was necessary in the work, the actual number of young produced, and the relation between the embryo capacity of the two oviducts, became additional subjects. As the taking of data progressed another relationship became evident, for mature females of the same size were not all bearing young. Thus, this paper, although short, treats of a series of related problems, and since it is impossible to gather more data upon them in the near future, it has been thought best to publish the results at the present time.

The work was done between June 28 and August 9, 1927, at the Biological Station of the University of Michigan. The writer wishes to express her appreciation to Dr. Frank N. Blanchard for assistance during the progress of this study, and to Dr. George R. La Rue for facilities offered by the Biological Station.

The availability of two subspecies of garter snakes in the Douglas Lake region has led the writer to

1. Contribution from the Biological Station of the University of Michigan.

elect them as the subject of this study, and a discussion of each is given below.

Thamnophis sirtalis sirtalis (Linne)

During the summer of 1927 this snake has been found to be abundant and widely distributed. Specimens have been taken from a variety of situations; marshes, woods, clearings, roadsides, cultivated areas, open fields of grassland, and along lake margins and pools.

In northern Michigan the period of parturition of *T. sirtalis sirtalis* is evidently beyond the time covered by this work. That this period is, however, an extended one is shown by the fact that embryos were found in widely different stages of development in different snakes on the same day. Ruthven (1908, p. 178) made the general statement that "the period of parturition extends from the latter part of July to about the middle of September."

The relation of size to the bearing of embryos in the 43 females examined is shown in the following table.

	Total length (in mm.)	Number without embryos	Number with embryos
Immature	351–400	3	none
"	401–450	4	none
"	451–500	5	none
"	501–550	3	none
Mature	551–600	8	1
"	601–650	4	1
"	651–700	4	2
"	701–750	1	3
"	751–800	3	none
"	801–850	none	none
"	851–900	none	1
	SUMMARY		
Immature	351–550	15	none
Mature	551–900	20	8

It will be noted that the reproductive age seems to

be reached after the females have attained the length of 550 millimeters. On this basis, twenty of the 35 specimens that did not have embryos in their oviducts had reached maturity. Thus, of the 28 females that had grown to the size of maturity, twenty, or over seventy percent, were not bearing young, and only eight, or less than thirty percent, had embryos in their oviducts.

A detailed presentation of data on the embryos of the eight gravid females is given in the following table.

Total length	Embryos in oviducts		
(in mm.)	Left	Right	Total
551	8	10	18
650	3	11	14
680	6	9	15
685	5	11	16
706	6	6	12
711	4	8	12
712	5	11	16
890	15	17	32
Averages	6.5	10.4	16.9
Percents	38.5	61.5	100.0

Thus, the average number of young produced, approximately seventeen, falls within the range of ten to thirty, given by Ruthven (1908, p. 178). The table also shows that the number of embryos in the right oviduct is in seven cases greater than and in one case equal to the number in the left. This suggests that the left oviduct may be in the process of evolutionary decline.

Thamnophis sauritus sauritus (Linne)

Ribbon snakes were not really abundant in the Douglas Lake region during the summer of 1927. They are more aquatic than *T. sirtalis sirtalis*, and their distribution is largely confined to marshes and bogs, and the margins of small lake pools.

Since all of the ribbon snakes examined in the present study were collected before August 1, and

none of the embryos observed in the oviducts were ready to be born, it is highly probable that none of the females used had passed their parturition date.[1]

The relation of size to the bearing of embryos in eighteen females examined is shown in the table below.

	Total length (in mm.)	Number without embryos	Number with embryos
Immature	451–500	1	none
"	501–550	1	none
"	551–600	4	none
Mature	601–650	5	1
"	651–700	1	4
"	701–750	none	none
"	751–800	1	none
	SUMMARY		
Immature	451–600	6	none
Mature	601–800	7	5

This indicates that the age at which a female of this subspecies is able to reproduce is reached after it has attained a length of 600 millimeters. Seven of the thirteen females that did not have embryos in their oviducts measured over this length, showing that over half of the specimens, that had reached the size of maturity, were not producing young.

Data on the embryos of the five gravid females are presented in the table below.

Total length (in mm.)	Embryos in oviducts		
	Left	Right	Total
643	4	3	7
662	2	4	6
668	2	6	8
680	2	2	4
682	0	5	5

1. Langlois (1924) after studying individuals from this same area, wrote that "A female collected on August 1 contained seven embryos, four in the right oviduct and three in the left..... a female opened on August 6 contained nine embryos".

Averages	2	4	6
Percents	33.3	66.7	100.0

The above table indicates that an average of six young is produced by this subspecies. However, Ruthven (1908, p. 112) stated that it "Seems to average about a dozen." In the series of embryos, twice as many were found in right as in left oviducts, approximating the condition found in the common garter snake.

SUMMARY

1. All females below 550 millimeters for *T. sirtalis sirtalis*, and below 600 millimeters for *T. sauritus sauritus*, were found to be without embryos.

2. In both subspecies the right oviduct bears the greater number of embryos.

3. The average number of young produced by *T. sirtalis sirtalis* is approximately seventeen, whereas, the number of *T. sauritus sauritus* is only six.

4. Embryos of *T. sirtalis sirtalis* showed different stages of development in various individuals at the same date, indicating a long parturition and a long mating period.

5. In both subspecies over half of the mature females were not bearing young.

LITERATURE CITED

Langlois, T. H. 1924, Notes on Some Michigan Snakes, Papers Michigan Acad. Sci. Arts and Letters, 4:605–610.

Ruthven, Alexander G. 1908, Variations and Genetic Relationships of the Garter-snakes. Bull. United States Nat. Mus. 61:1–201.

MAY DANHEIM BURT

Ann Arbor, Michigan.

SEXUAL DIMORPHISM IN THE TAIL LENGTH OF THE COMMON GARTER SNAKE, *THAMNOPHIS SIRTALIS SIRTALIS* (LINNE)[1]

A review of the literature on garter snakes indicates that sexual dimorphism in the tail length of the subspecies, *Thamnophis sirtalis sirtalis*, has not received much attention. During the summer of 1927 while attending the Biological Station of the University of Michigan, which is located in Cheboygan County, the writer was able to collect a series of over fifty specimens. In addition to these the collection in the Museum of Zoölogy of the University of Michigan has been studied. The length of tail has been computed as percent of total length[2] for each individual and the results may be summarized as follows:

	Tail length as percent of total length	Males	Females	Both Sexes	Percent of total number
Group I	18.1–19	none	1	1	32.4
	19.1–20	none	12	12	
	20.1–21	none	14	14	
	21.1–22	none	38	38	
Group II	22.1–23	12	28	40	56.0
	23.1–24	25	19	44	
	24.1–25	25	3	28	
Group III	25.1–26	13	none	13	11.6
	26.1–27	5	none	5	
	27.1–28	1	none	1	
	28.1–29	2	none	2	
	29.1–30	1	none	1	
	30.1–31	1	none	1	
Total		85	115	200	100.0

1. Contribution from the Department of Zoology, University of Michigan.

2. It may be of interest to note that the longest female examined measured 893 mm. and the longest male 764 mm.

In the above table there is a range of 44.0 percent (Groups I and III) in which males and females of the series may be separated by the length of their tails as percent of total length. The rest, or 56.0 percent, are in Group II in which there is representatives of both sexes. Thus, a marked, but not complete sexual dimorphism in the tail length of these common garter snakes is indicated by these data.

The range of variation in tail percent set by this work is 18.8 to 30.8, an extension of the range given by Ruthven (Var. Gen. Rel. Garter Snakes, 1908, p. 176), which was 19.2 to 26.2.

CHARLES E. BURT

Department of Zoology,
Univ. of Michigan,
Ann Arbor, Michigan.

THE REPTILES OF ZION NATIONAL PARK[1]

The main feature of Zion National Park is Zion Canyon with its precipitous walls and plateau above. The Virgin river, flowing through the canyon, passes on down through Utah's "Dixie," and the fauna of the Park is largely an extension from this lower region. The town of Springdale is situated in the mouth of Zion Canyon and is bordered by the Park on three sides. It is truly a part of the canyon and, therefore, for the purposes of this study, is considered as an integral part of the Park.

This report is based primarily upon collections made by myself during three seasons' service as Park Naturalist. It is not claimed that the present list of twenty-one species is complete. It is known that other species occur in the region below and it is quite likely that some of these may range into the Park; but no forms are included in this list for the occurrence of which there is not direct evidence.

1. Contribution from the Zoological Laboratory of the University of Utah

I am indebted to Joseph R. Slevin, of the California Academy of Sciences, for aid in determining a few perplexing specimens and to Dr. R. V. Chamberlin for advice in the course of the preparation of this report.

1. *Sauromalus ater* Dumeril.
   Chuckwalla.

This wide, flat-bodied, herbivorous reptile lives mostly around sunny ledges at the lower altitudes in the vicinity of the Park. It hides in crevices of ledges or under boulders in areas seldom frequented by man, but during sunny days (when not too hot) it may often be found resting on the rocks in the sun. I have never seen one attempt to bite, although I have handled them a great deal. The tail appears to be the chief weapon of defense and when picked up by that organ, the lizard appears to be helpless.

2. *Crotaphytus collaris baileyi* (Stejeneger).
   Western Collared Lizard.

This lizard is not very common in the Park. I have collected specimens from near the petrified forest and have seen them on Pine Creek. They have been reported from the main canyon near the public camp ground. These lizards are shy and wary. When disturbed they will dart quickly to some nearby bush or rock where they will lie quietly until disturbed again, when they may run swiftly long distances to the shelter of some large rock or ledge. One of the rangers reports that he has seen them chasing the smaller lizards, and that when doing so, they pay little attention to man. He states that the *Scelopori* often escape by climbing, but the *Cnemidophori* do so by running, being fleeter of foot. Apparently neither *Crotaphytus* nor the *Cnemidophori* are good climbers.

3. *Uta levis* Stejeneger.
   Rocky Mt. Tree Uta Lizard.

This form lives mostly on the ledges and cliffs throughout the canyon. I have never seen it on the

floor of the canyon nor on the plateau above, but have collected it on Angel's Landing, Refrigerator Canyon, and Bridge Mt. It is a curious little fellow and, after running around the corner of a rock, will usually keep his head in view so he can watch you.

4. *Uta stansburiana stansburiana* (Baird & Girard)
Northern Brown-Shouldered Uta Lizard.

This lizard is of common occurrence along many of the trails on the rocky slopes of Zion Canyon. It is more shy and wary than the *Uta levis*, and is much harder to capture.

5. *Sceloporus graciosus graciosus* (Baird & Girard)
Sagebrush Swift.

This form is very common from the floor of the canyon up to the plateau above. It is mostly a ground dweller and, when disturbed, scurries to a bush or shrub for shelter, where it will lie quietly unless approached too closely. It is very common among the manzanita and similar shrubs. It is very shy in the open but appears complacent enough in the shelter of the bush. The markings on this lizard are very similar to *S. elongatus* and the two are often hard to distinguish.

6. *Sceloporus elongatus* Stejeneger.
Stejeneger's Blue-bellied Lizard.

This variably marked lizard is a very common resident of the Park. It is a rock- or tree-dwelling form and can climb with agility up the faces of rocks, buildings or trees. It seems not to be frightened of humans as it will live on the walls of cabins that are daily occupied. It is an insectivorous form. I have watched it catch grasshoppers, crickets, leaf hoppers, ants, moths, bugs and other forms of insects. A grasshopper alighted near one, and the lizard made such a lightning-like dash to the spot that it had the insect almost before its wings were folded. Sometimes they will run long distances over a wall and stop near an insect, creep slowly until within range and then

make a quick dive. They will often sit on the side of a rock or building and watch you curiously, and may be easily captured by the hand.

7. *Sceloporus magister* Hallowell.
Desert Scaly Lizard.

This large lizard is most abundant in the valleys of Dixie below the Park; but its range extends up the floor of Zion Canyon. I have taken it up as far as the foot of Angel's Landing. It lives mostly in the growths of trees and bushes which it climbs with agility. When disturbed on the ground, it will run to a tree, if available, and keep on the opposite side of the trunk, moving around as you move.

8. *Phrynosoma douglasii ornatissiumum* (Girard).
Short-horned Horned Toad.

I have never collected this species with the short horns in Zion Park, but there is a specimen at the University of Utah collected by Dr. Chamberlin in June, 1927, near the Grotto in Zion Canyon. This lizard ranges on down the lower slopes into the warm valleys below and probably over many of the mountain slopes.

9. *Phrynosoma platyrhinos* Girard.
Desert Horned Toad.

This is one of the interesting forms seldom seen in the Park. It is fairly common on the lower slopes and down to the warm valleys below.

10. *Heloderma suspectum* Cope.
Gila Monster.

This, the largest of all the lizards of the region, is a slow-moving, awkward creature. Despite its clumsy form, it can get around remarkably well among the rocks and bushes. In captivity, it becomes very docile and may be handled with ease. But if set outside in the sun for a short time, it livens up and moves with much more agility than would be expected from its

form. Some of the different kinds of snakes and lizards will live amicably together in confinement, but not so the Gila monster. I have kept two gopher snakes, two striped racers, and two rattlesnakes together without friction, but on two different occasions when I put a rattlesnake in with a monster the snake was killed. Teeth marks in the snake showed plainly how it had been done. The monster usually lives in the rocky ledges and is commonly reported between Rockville and Springdale. One has also been reported from the ledges near the top of the West Rim trail.

11. *Cnemidophorus gularis* Baird & Girard.
Sonoran Whiptail Lizard.

This form is very common on the floor of the canyon and is certain to be seen by most everyone visiting the Park. It is a ground-dwelling lizard and seems not to be able to climb. When disturbed, it will dart for shelter to a nearby bush or plant. After a rain I saw one run into a puddle of muddy water to hide. I reached down into the pool and it lay limp and motionless when I picked it up. It was, however, ready to spring into action at the first sign of relaxation of the hold on it. These are very active lizards as befits them for their insectivorous life. The stripes on the back make them rather conspicuous and their ability as runners is undoubtedly a saving factor in their protection from predaceous animals. One of the rangers reports seeing one of these lizards outrun a *Crotaphytus* which was chasing it. One specimen had in its stomach a small *Stenopelmatus*, a caterpillar, and some ground beetles. I watched one dig under the edge of a board and uncover a green caterpillar so large it had to try twice before swallowing it.

12. *Cnemidophorus tesselatus tesselatus* (Say).
Desert Whiptail Lizard.

This lizard is also a ground-dweller with habits similar to *gularis* but appears to be more common in

sunnier situations. It appears to be unable to climb well. One cornered against the side of a frame cabin, in attempting to escape by climbing, fell off and made no further attempt to escape by that method. I watched one feeding where insects had dropped to the ground at a light the night before. It picked up numerous ants and termites and even took one of the latter away from a large red ant but made no attempt to eat the latter. It also picked up moths, bugs and other types of insects that were lying there dead or alive.

13. *Plestiodon skiltonianus* (Baird & Girard).
Skilton's Skink; Western Skink.

This peculiar lizard is seldom seen. It inhabits the upper levels of the canyon and the plateau above. I have never seen one on the floor of the canyon. It is a very delicate animal and must be handled carefully to hold it intact. The slender blue tail will drop off at the slightest rough treatment.

14. *Diadophis regalis* Baird & Girard.
Sonoran Ring-necked Snake, or Thimble Snake.

This beautiful little snake is a very rare find. We have one specimen only in the collection. This was captured by F. D. Gifford at Springdale. It is also reported from Grass Valley in the western part of Washington County, Utah. To local people, it is known as the Thimble Snake from a peculiar habit which it possesses of curling its tail with the bright colored under parts outside. The black dots on the border give it a faint resemblance to a thimble. It appears to be very shy in its habits and is seldom seen.

15. *Masticophis flagellum piceus* (Cope).
Western Whip Snake, or Red Racer.

This racer is occasionally found along the floor of the canyon, but more often in the fields along the river below. I saw one chase and catch a *Cnemidophorus tesselatus*.

16. *Masticophis taeniatus taeniatus* Hallowell.
Western Striped Racer.

This racer is very agile. It is, next to *Pituophis*, the most common snake of the Park. One specimen that I captured had a mouse head in its stomach. Another specimen, when placed in a cage with small lizards and some other snakes, promptly fell to eating the lizards, (*Sceloporus elongatus*). It would snap a lizard around the body, and then carefully work it around in the mouth until it was started down head first.

17. *Pituophis catenifer stejenegeri* Van Denburgh.
Utah Gopher Snake.

This is the most common snake of the Park along the floor of the canyon. It is of great economic importance in controlling harmful rodents. One medium sized snake 3½ to 4 feet in length had nine mice in its stomach. Seven of them were vomited when the snake was captured and placed in confinement. I have seen these snakes eat both mice and gophers in captivity. They are constrictors and kill their prey before eating it. This snake is usually very docile in captivity.

18. *Lampropeltis getulus boylii* Baird & Girard.
Boyle's King Snake, or Boyle's Milk Snake.

This strikingly banded snake is occasionally found along the floor of the canyon in the Park but more often in the fields near Springdale. It is usually docile and easily handled.

19. *Hypsiglena ochrorhynchus orchrorhynchus*
Stejeneger & Barber.
Spotted Night Snake.

This small snake is very rarely seen in the Park. In three years of collecting, I have taken only one specimen. This one was captured in the rocks beside the river.

20. *Thamnophis ordinoides vagrans* (Baird & Girard).
Wandering Garter Snake.

This little snake appears to keep near the streams and ponds. It slips off quickly into the vegetation when disturbed.

21. *Crotalus oreganus* Holbrook.
Pacific Rattlesnake.

This snake eats mice and other rodents and perhaps lizards. So far as I have observed it will not eat in captivity. One held from August to April steadfastly refused to eat of its own accord.

The following reptiles are reported as having been collected in Utah's Dixie in the region below the Park. It is entirely possible that the range of some of these may extend up into Zion Canyon.

Coleonyx variegatus (Baird).
Banded Gecko.
Crotaphytus wislizenii Baird & Girard.
Leopard Lizard.
Sceloporus occidentalis biseriatus (Hallowell).
Western Blue-bellied Lizard.
Sonora semi-annulata Baird & Girard.
Bi-colored Ground Snake.
Tantilla nigriceps Kennicott.
Sonoran Tantilla.
Micrurus euryxanthus (Kennicott).
Sonoran Coral Snake.
Crotalus cerastes Hallowell.
Horned rattlesnake.

ANGUS M. WOODBURY
University of Utah,
Salt Lake City, Utah.

YELLOW-CHEEKED *DESMOGNATHUS* FROM MACON COUNTY, N. C.

The new form of *Desmognathus carolinensis* (*imita-*

tor), described by Dr. Dunn, in No. 164 of Copeia, was particularly interesting to me as I had taken yellow or orange cheeked specimens of that species as far back as 1908, but in Macon county in the Nantahala range, and not in the Great Smokies.

These were two specimens taken in May, 1908, one at Highlands and one on Wayah Bald. Both had yellow or orange cheek patches on each side as described by Dr. Dunn for *imitator*, and both were probably dark colored specimens, as I remember wondering if they might by any possibility be *Plethodon jordani* which I had not seen at that time, but reluctantly dismissing that idea as they were unmistakably *Desmognathus* and not *Plethodon*. These were mentioned by me under the head of *Desmognathus ochrophea* (*carolinensis* had not then been described) in the Proceedings of the Biological Society of Washington for December 4, 1912, and are now in the National Museum. Probably the color of the cheeks has long since faded.

A third specimen also with yellow cheek patches was taken by Mr. Franklin Sherman, State Entomologist of South Carolina, on Wayah Bald on November 7, 1926. This, Mr. Sherman gave me the pleasure of examining, along with other specimens taken on the same trip but I have no notes on it except as to the existence of the yellow cheek patches.

I have seen one other yellow cheeked *Desmognathus* from North Carolina, this being one taken on June 24, 1924, near Nellie, Haywood county, also by Mr. Sherman. This is a medium sized specimen, 38 mm. long head and body, and 22 mm. tail (regenerated), wholly pale below and with faintly indicated pale stripe on back. In this specimen not only were the cheek patches yellow (my notes say orange, but the color has largely faded since), but the front legs as far as the elbows are also yellow (orange in my notes).

The other eight specimens of *carolinensis* taken at the same time and place show nothing out of the ordinary.

In all these four cases the single yellow cheeked specimen was only one out of several taken at the same time and place, which would seem to me to preclude a geographical race or sub-species and to indicate either a full species or an individual variation.

It may be remarked here that all these yellow cheeked *Desmognathus* come from the range either of the red cheeked *Plethodon jordani* or the red legged *P. shermani*. Probably the same causes which operate or have operated to cause the acquisition or retention of red or yellow markings in the *Plethodons*, have also produced the yellow or orange cheeks of these *Desmognathus*.

These *Plethodons* of the *jordani* group in the southern mountains are, by the way, very puzzling to me. They hardly seem distinct enough to be full species; their habitats are woefully limited; and yet so far as we know they do not seem to intergrade. Anyway one looks at it, the southern Alleghanies seem to be prolific in "difficult" salamanders, possibly the normally heavy rainfall has something to do with it.

C. S. BRIMLEY

N. C. Dept. of Agriculture,
Raleigh, N. C.

DISTRIBUTIONAL LIST OF THE AMPHIBIANS AND REPTILES OF UTAH[1]

No. 2

This second report on the distribution of Utah amphibians and reptiles is based upon the collections made during the past summer (1927) by the Second

1. Contribution from the Zoological Laboratories of the Brigham Young University, Provo, Utah. No. 14. Distributional List of the Amphibians and Reptiles of Utah. No. 1 was published in Copeia, No. 163.

Zoölogical Expedition of the Brigham Young University. Six weeks were spent in southeastern Utah, a region in which very little biological collecting has been done. Many new species of insects, spiders, and centipedes were collected and new state records were definitely established for several species of fish, amphibians, reptiles, and birds. Information concerning some species not reported at this time was gained from the pioneer people and the Navajo Indians. For example, I am convinced that the Mud Turtle, *Kinosternon flavescens* is to be found in suitable places along the San Juan River in Utah. Specimens have been taken by the people and Indians of the region. Floods during the time we were on this river made careful collecting an impossibility. I have not reported any species that are not in the University collection. It is the purpose of the summer expeditions to collect specimens and field notes from which the fauna of the state may be accurately studied. Plans for the summer work of 1928 provide for the collecting to commence in the Raft River Mts. and the Grouse Creek Mts. of northwestern Utah then south along the Utah Nevada state line to the Sevier Lake region then east to the High Plateaus of central Utah. It is hoped that such rare species as *Rana onca* Cope, *Hyla regilla* B. & G. and *Salvadora hexalepis* (Cope) will at this time be collected.

41. *Bufo cognatus cognatus* (Say).

Locality: Green River (Emery Co.). Specimens of this species were taken June 6, 1927 during the breeding season. Songs of this species and *B. woodhousi*, with which it was associated, could be heard in many parts of this little valley at night. Small larvae were taken in the ponds and pools near the river and the railroad track. Eggs were taken in a pond near a corral which was almost black in color due to the drainage from the manure. At night this pond was a

congregating place for the noisy chorus. I can find no records of this species having been collected in Utah.

42. *Bufo compactilis* Wiegmann.

Localities: Zion National Park and St. George (Wash Co.). I have taken this species in copula at St. George in May. Mr. Englehardt reports taking it in the same ponds in which he found *Scaphiopus hammondi hammondi* (Copeia, No. 60). This toad is common on the trails and roads of the floor of the canyon in Zion Park from about the 15th of July to the 15th of September.

43. *Bufo punctatus* B. & G.

Localities: Bluff and Natural Bridges, Caroline Bridge, (San Juan Co.); Zion National Park.

From June 27 to 29 we were in the Bridges region at which time this species and *Scaphiopus hammondi hammondi* were the only amphibian species collected. In the water pockets of the rocks and the water holes of the otherwise dry stream beds were thousands of small black tadpoles. I am not sure whether these represented the larvae of both or either of these species.

NOTE.—Before discussing the reptiles of this list I wish to make one correction in Mr. Englehardt's observations on *Rana pipiens* Sch. Copeia No. 60, p. 79. He writes: "The range of this species does not extend into the Colorado River drainage of southwestern Utah." I am forced to disagree with this as I have taken this common *Rana* at St. George and along the Virgin River above St. George and below as far as the "Narrows". I have also collected it at LaVerkin and Rockville. Farther north and east I have collected it at Alton and Panguitch, also at practically every station in Grand and San Juan counties.

44. *Holbrookia maculata approximous* (Baird).

Locality: Monumental Valley (San Juan Co.).

This earless lizard was taken in the Monumental

valley of Utah and at Keyenta and Tuba City, Arizona. I have a specimen from Eagar, Arizona, which agrees with these specimens. I am unable to follow Schmidt in his recent work on the Arizona *Holbrookia*, but prefer to follow Van Denburgh and call these northern forms *H. m. approximous*. The specimens I have are extremely variable. This definitely establishes this species in Utah. Dr. Van Denburgh questioned its occurence in Utah.

45. *Uta levis* Stejneger.

Localities: Moab (Grand Co.); Green River (Emery Co.); Natural Bridges; Blanding; Ute Mountain near Utah–Colorado state line; (San Juan Co.); and Zion National Park.

One of the common lizards throughout San Juan County, Utah; Montozuma and Mesa Verda National Park, Colorado; and northern New Mexico and Arizona.

46. *Uta stansburiana elegans* (Yarrow).

Localities: St. George and the Virgin River valley.

Since this is more or less of a geographical subspecies and in great need of careful study in connection with all the species of this genus, I hesitate to list it at this time. The species of this region differ from those of the northern and eastern parts of the state and agree in the main with the descriptions given for this form by Richardson and Van Denburgh. I have a student who would like to get material from all collections that care to loan specimens in order that he may critically study this genus.

47. *Phrynosoma douglassi ornatum* (Girard).

Localities: Lehi, Provo; Salem; Salt Lake City; and Cedar Valley. All in the Salt Lake Basin. Some of these specimens were discussed under *P. d. ornatissimum* in my paper in Copeia, No. 163.

In the horned lizards before me, consisting of 57

specimens, I am able to recognize what seems to me to be two forms, *P. d. ornatum* and *P. d. ornatissimum. Ornatum* seems to be confined to the Salt Lake Basin. In this subspecies the head and occipital spines are not as large and long and more erect than in *ornatissimum.* The infralabiles are not as large and are narrower and more pointed, the head is not as flat and is more pointed, and the color is usually blackish, bluish and grayish mottled in *ornatum.*

Dr. Stejneger pointed out in Copeia, No. 65, that the Salt Lake valley sub-species is a distinct one and should be known by the name which Baird proposed for it in 1858. My study of specimens from this region convinces me that he is right. Just what the range of *ornatum* and *ornatissimum* is remains to be worked out. Dr. Ruthven and Miss Gage (1925, p. 23), considered specimens taken at Carlin, Maggie Basin, Nevada, as *P. d. hernandesi;* while Dr. Van Denburgh (1922) calls specimens taken at Carlin and all parts of Utah *P. d. ornatissimum.* Specimens I have collected at Green River, Moab, LaSal, Natural Bridges, Bluff, Kanab, Panguitch, and Duschesne are clearly *ornatissimum.*

48. *Cnemidophorus gularis* B. & G.

Localities: Bluff (San Juan Co.); Zion National Park. This lizard was also taken at several places in the Montozuma Valley, on the Mancos River and Mesa Verda National Park of Colorado.

49. *Pituophis catenifer deserticola* Stejneger.

Localities: Provo (Utah Co.); and near Eureka (Juab Co.).

50. *Lampropeltis triangulum gentilis* (B. & G.).

Locality: Provo (Utah Co.). A rare species in Utah.

51. *Thamnophis eques* (Reuss).

Localities: Moab (Grand Co.); Bluff (San Juan

Co.). This is a new record for the state. Five specimens were taken, all in small streams tributary to the Colorado and San Juan rivers.

VASCO M. TANNER

Brigham Young University,
Provo, Utah.

COPEIA is the Journal of the American Society of Ichthyologists and Herpetologists. Subscription for 1928, $1.00; 25 cents per copy. Dues to the Society, $2.00 a year, including subscription to Copeia.

OFFICERS

President—H. W. Fowler.
Vice-Presidents—J. T. Nichols, Leonhard Stejneger.
Treasurer—A. W. Henn, Carnegie Museum, Pittsburgh.
Secretary and Editor of Copeia—E. R. Dunn, Burton Hall, Northampton, Mass.

Separates of any articles printed in Copeia may be had at the following prices if ordered when sending in manuscript: $2.00 per printed page for the first hundred, add 50c per page for each hundred thereafter. Send such orders either to the editor or direct to the Kingsbury Box & Printing Co., 38-40 North St., Northampton, Mass.

Back numbers, when available may be obtained from J. T. Nichols, American Museum of Natural History, New York City (1–125, 10c a copy); E. R. Dunn, Burton Hall, Northampton, Mass. (126–161, 10c a copy; 162–to date, 25c a copy).